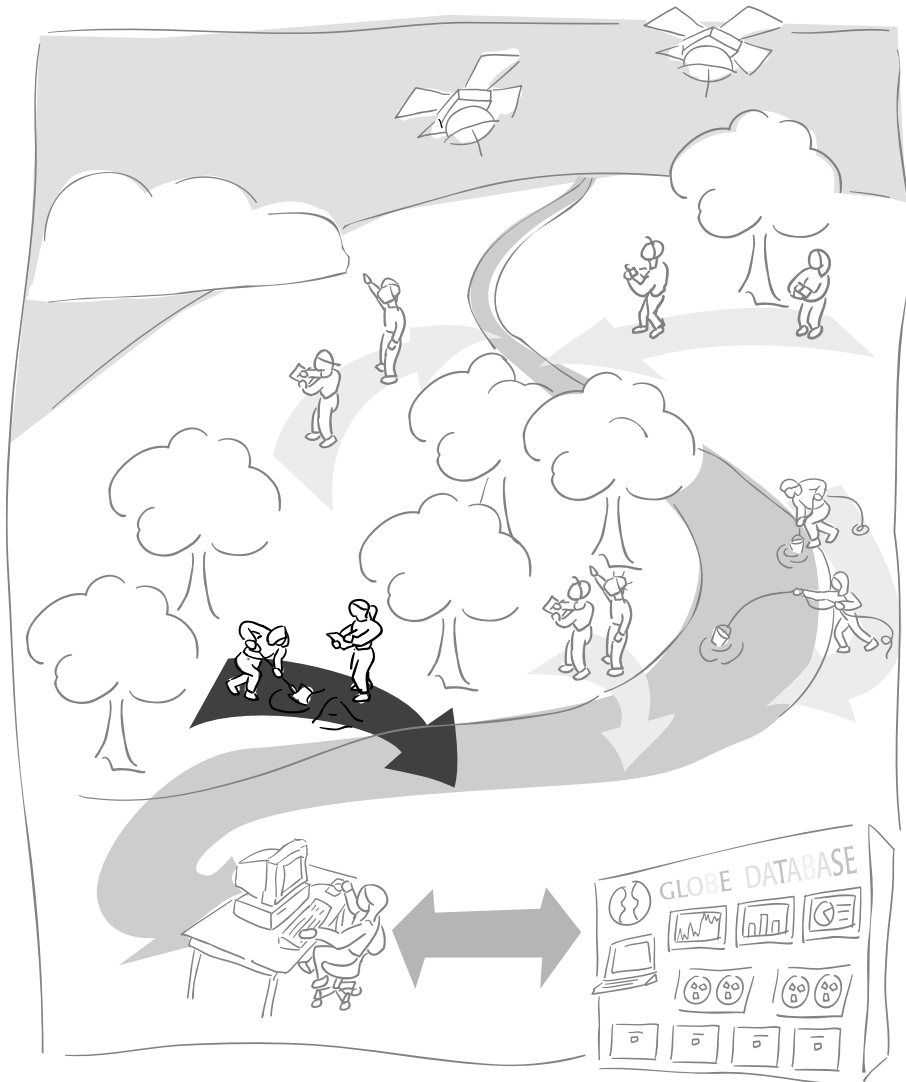


Soil Investigation



A GLOBE® Learning Investigation



Soil Investigation at a Glance



Protocols

Measurements taken at Soil Characterization Sites:

- top and bottom depths for each horizon in the soil profile
- structure, color, consistence, texture, and amounts of rocks, roots, and carbonates

- bulk density, particle density, particle size distribution, pH, and fertility (N, P, K) of samples taken from each horizon

Measurements taken at Soil Moisture or Atmosphere Sites:

- soil moisture during two annual campaigns, 12 times per year, or monitored

- soil temperature, daily or weekly, with diurnal variation 2 days every 3 months or monitored every 15 minutes

Suggested Sequence of Activities

Read the *Introduction*.

Read the *Protocols* to learn precisely what is to be measured and how.

Choose any *Learning Activities* that might support the *Protocols*.

Make copies of the *Data Sheets* in the *Appendix*.

Perform the *Soil Characterization Protocols*.

Perform the *Soil Temperature Protocol*.

Perform the *Gravimetric Soil Moisture Protocol*.

Perform the *Bulk Density, Soil Particle Density, Particle Size Distribution, Soil pH, and Soil Fertility Protocols*.

Visit the GLOBE Web site with your students and review the data submission pages for Soils.

Submit your data to the GLOBE Student Data Server using the Web or email.



Special Notes

If you choose to dig a soil pit, you may require help with digging. It is also important to obtain permission from your local utility company to make sure that there is not a pipe or wire buried at that location.



Table of Contents



Introduction

Why Investigate Soils?.....	Introduction 1
The Big Picture.....	Introduction 2
GLOBE Measurements	Introduction 9
Individual Measurements.....	Introduction 9



Protocols

Selecting, Exposing and Describing a Soil Characterization Site
Soil Characterization Protocol
Soil Temperature Protocol
Gravimetric Soil Moisture Protocol
Bulk Density Protocol
Soil Particle Density Protocol
Particle Size Distribution Protocol
Soil pH Protocol
Soil Fertility Protocol
Digital Multi-Day Max/Min/Current Air and Soil Temperature Protocol (see Atmosphere Chapter)
Optional Digital Multi-Day Soil Temperatures Protocol*
Optional Automated Soil and Air Temperature Monitoring Protocol*
Optional Soil Moisture Sensor Protocol*
Optional Water Infiltration Protocol*
Optional Davis Soil Moisture and Temperature Station Protocol*



Learning Activities

Why do We Study Soil?*
Just Passing Through - Beginners
Just Passing Through
Soil and my Backyard*
A Field View of Soil - Digging Around*
Soils as Sponges: How Much Water Does Soil Hold?*
Soil: The Great Decomposer*
The Data Game*



* See the full e-guide version of the *Teacher's Guide* available on the GLOBE Web site and CD-ROM.



Appendix

Soil Characterization Site Definition Sheet.....	Appendix 2
Soil Characterization Data Sheet	Appendix 3
Soil Temperature Data Sheet	Appendix 4
Soil Moisture Site Definition Sheet.....	Appendix 5
Soil Moisture Data Sheet – Star Pattern	Appendix 7
Soil Moisture Data Sheet – Transect Pattern	Appendix 8
Soil Moisture Data Sheet – Depth Profile.....	Appendix 9
Bulk Density Data Sheet	Appendix 10
Soil Particle Density Data Sheet.....	Appendix 11
Soil Particle Size Distribution Data Sheet	Appendix 12
Soil pH Data Sheet.....	Appendix 13
Soil Fertility Data Sheet.....	Appendix 14
Digital Multi-Day Soil Thermometer Calibration and Reset Data Sheet	Appendix 15
Digital Multi-Day Soil Thermometer Data Sheet.....	Appendix 16
Daily Soil Moisture Sensor Data Sheet	Appendix 17
Biannual Soil Moisture Sensor Calibration Data Sheet.....	Appendix 18
Soil Infiltration Data Sheet.....	Appendix 20
Textural Triangle.....	Appendix 21
Glossary	Appendix 22